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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/551,732	10/03/2005	Kunihiro Oda	OGOSH40USA	4329

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EXAMINER	
FOGARTY, CAITLIN ANNE	
ART UNIT	PAPER NUMBER
1793	

MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/551,732	ODA ET AL.	
	Examiner	Art Unit	
	CAITLIN FOGARTY	1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 February 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,7,8,13-27 and 29-31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,7,8,13-27 and 29-31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *03 October 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *2/4/2009*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status of Claims

1. Claims 1 – 3, 7, 8, 13 – 27, and 29 – 31 are pending where claims 8, 29, and 30 have been amended and claim 31 is new. Claims 4 – 6, 9 – 12, and 28 have been cancelled.

Status of Previous Rejections

2. The 35 U.S.C. 102(b) rejection of claims 1 – 3, 7, and 13 – 18 as being anticipated by Turner (US 6,331,233) is withdrawn in view of the arguments filed February 4, 2009.

The 35 U.S.C. 103(a) rejection of claims 8 and 19 – 30 as being unpatentable over Turner (US 6,331,233) is withdrawn in view of the arguments filed February 4, 2009.

Priority

3. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

4. The information disclosure statement (IDS) was submitted on February 4, 2009. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Claim Objections

5. Claims 29 and 30 are objected to because of the following informalities: Claims 29 and 30 recite temperatures with the units degrees Celsius whereas the rest of the

claims recite temperatures using the units Kelvin. Therefore, the instant claims should be amended so that all temperature values have consistent units. Appropriate correction is required.

Claim Rejections - 35 USC § 103

6. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

7. Claims 1 – 3, 7, 8, 13 – 27, and 29 – 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Segal et al. (US 2001/0054457 A1).

With respect to instant claim 1, [0002], [0009]-[0013], [0046], [0051], [0058], [0077]-[0081], and [0088]-[0090] of Segal disclose an Al, Ti, Cu, **Ta**, Ni, Mo, Au, Ag, or Pt sputtering target manufactured by subjecting, for example, a cast Ta ingot to hot forging, annealing and optionally cold rolling. Segal differs from instant claim 1 because it does not specifically teach that the Ta sputtering target has a non-recrystallized structure. However, [0078] and [0079] of Segal teach the embodiment of intermediate annealing between extrusion passes at low temperature or just at the beginning of static recrystallization. Therefore, it would have been obvious to one of ordinary skill in the art to follow this embodiment of Segal to produce a Ta sputtering target with a non-recrystallized structure in order to achieve a strong uniform texture (see [0079] of Segal).

Segal differs from instant claims 2 and 3 because it does not specifically teach that the non-recrystallized structure is 20% or more or 40% or more. However, [0078]-[0081] of Segal teaches a method of annealing below the recrystallization temperature

of the target and a method of annealing above the recrystallization temperature of the target and the benefits of both methods. Furthermore, [0081] of Segal teaches that the intermediate anneal may be repeated several times in order to enhance the effects of the annealing. Therefore, it would have been obvious to one of ordinary skill in the art to use the desired amount of annealing below the recrystallization temperature and annealing above the recrystallization temperature in order to form a sputtering target with the desired percentage of non-recrystallized temperature in order to achieve the desired uniform texture (strong or weak) of the sputtering target.

In regards to instant claim 7, [0002], [0009]-[0013], [0046], [0051], [0058], [0077]-[0081], and [0088]-[0090] of Segal disclose a method of manufacturing an Al, Ti, Cu, **Ta**, Ni, Mo, Au, Ag, or Pt sputtering target. The method comprises subjecting a cast Ta ingot to forging, annealing and optionally cold rolling, and plastic working. Segal does not specifically teach that the Ta sputtering target is molten and cast. However, it is well known in the art that an ingot casting of Ta, for example, may be formed using molten Ta. Segal differs from instant claim 7 because it does not specifically teach that the Ta sputtering target has a non-recrystallized structure. However, [0078] and [0079] of Segal teach the embodiment of intermediate annealing between extrusion passes at low temperature or just at the beginning of static recrystallization. Therefore, it would have been obvious to one of ordinary skill in the art to follow this embodiment of Segal to produce a Ta sputtering target with a non-recrystallized structure in order to achieve a strong uniform texture (see [0079] of Segal).

Regarding instant claim 8, [0002], [0009]-[0013], [0046], [0051], [0058], [0077]-[0081], and [0088]-[0090] of Segal disclose a method of manufacturing an Al, Ti, Cu, **Ta**, Ni, Mo, Au, Ag, or Pt sputtering target. The method comprises subjecting a cast Ta ingot to forging, annealing and optionally cold rolling, and extrusion (plastic working). Segal does not specifically teach that the Ta sputtering target is molten and cast. However, it is well known in the art that an ingot casting of Ta, for example, may be formed using molten Ta. Segal differs from instant claim 8 because it does not specifically teach that the Ta ingot is annealed at a temperature of 1173 K or less to provide the Ta sputtering target with a non-recrystallized structure. However, [0078] and [0079] of Segal teach the embodiment of intermediate annealing between extrusion passes at low temperature or just at the beginning of static recrystallization. Therefore, it would have been obvious to one of ordinary skill in the art to perform annealing at 1173 K or less because 1173 K is the recrystallization temperature of Ta. Furthermore, it would have been obvious to one of ordinary skill in the art to follow this embodiment of Segal to produce a Ta sputtering target with a non-recrystallized structure in order to achieve a strong uniform texture (see [0079] of Segal).

Segal differs from instant claims 13 – 16 because it does not specifically teach the Vickers hardness of the Ta sputtering target. However, one of ordinary skill in the art would have expected the Ta sputtering target of Segal to have a similar Vickers hardness since it is made using a method similar to that of the instant invention.

With respect to instant claim 17, [0013] of Segal teaches that after plastic working, the ingot is subjected to finish processing to form a target shape.

In regards to instant claim 18, [0011] and [0078]-[0081] of Segal disclose that the ingot is hot-forged and that both annealing below the recrystallization temperature and annealing above the recrystallization temperature (recrystallization annealing) may be performed on the Ta ingot. Segal also teaches that the annealing process may be repeated several times in order to enhance the desired effects of the annealing. Furthermore, it would have been obvious to one of ordinary skill in the art to perform the necessary amount of forging in order to achieve the desired size and shape of the hot forged product.

Segal differs from instant claims 19, 23, and 26 because it does not specifically teach that the forging step comprises extend forging and upset forging repeatedly performed on the ingot or billet. However, [0011] and [0046] of Segal discloses that known methods of hot forging are used in the forging step to achieve an ingot with reductions and a thickness sufficient for healing and full elimination of case defects. Therefore, it would have been obvious to one of ordinary skill in the art to perform the necessary known forging methods, including extend forging and upset forging, in order to achieve the desired size and shape of the hot forged product.

Segal differs from instant claims 20, 24, and 27 because it does not teach that the temperature of annealing is between the recrystallization temperature of the ingot and 1673 K. However, [0078] and [0080] of Segal teach the embodiment of intermediate annealing between extrusion passes at full static recrystallization temperature. Therefore, it would have been obvious to one of ordinary skill in the art to perform annealing above 1173 K because 1173 K is the recrystallization temperature of

Ta. This temperature range overlaps with the temperature ranges recited in instant claims 20, 24, and 27.

Regarding instant claim 21, [0013] of Segal teaches that after plastic working, the ingot is subjected to finish processing to form a target shape.

With respect to instant claims 22 and 25, [0011] and [0078]-[0081] of Segal disclose that the ingot is hot-forged and that both annealing below the recrystallization temperature and annealing above the recrystallization temperature (recrystallization annealing) may be performed on the Ta ingot. Segal also teaches that the annealing process may be repeated several times in order to enhance the desired effects of the annealing. Furthermore, it would have been obvious to one of ordinary skill in the art to perform the necessary amount of forging in order to achieve the desired size and shape of the hot forged product.

Segal differs from instant claims 29 and 30 because it does not teach that the annealing temperature is selected from the group consisting of 700°C, 775°C, and 800°C or that the temperature is in the range 700°C-800°C. However, [0078] and [0079] of Segal teach the embodiment of intermediate annealing between extrusion passes at low temperature or just at the beginning of static recrystallization. Therefore, it would have been obvious to one of ordinary skill in the art to perform annealing at 1173 K or less (900°C or less) because 1173 K is the recrystallization temperature of Ta. This temperature range overlaps with the temperature ranges recited in instant claims 29 and 30.

Segal differs from instant claim 31 because it does not teach that the tantalum sputtering target is made of high purity tantalum having a purity of 4N5 (99.995%) or more. However, [0002] of Segal teaches that the method may be used to produce sputtering targets of high purity Al, Ti, Cu, **Ta**, Ni, Mo, Au, Ag, and Pt. Therefore, it would have been obvious to one of ordinary skill in the art to use a high purity Ta, such as 4N5, in the method of Segal.

Response to Arguments

8. Applicant's arguments, see p. 6-13, filed February 4, 2009, with respect to the rejection(s) of claim(s) 1 – 3, 7, 8, and 13 – 30 under Turner (US 6,331,233) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Segal et al. (US 2001/0054457 A1).

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to CAITLIN FOGARTY whose telephone number is (571)270-3589. The examiner can normally be reached on Monday - Friday 8:00 AM - 5:30 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Roy King/
Supervisory Patent Examiner, Art Unit 1793

CF